Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the matter of	)	
	)	
Implementation of Sections 309(j) and 337	)	WT Docket No. 99-87
Of the Communications Act of 1934, as	)	
Amended	)	
	)	
Promotion of Spectrum Efficient	)	
Technologies on Certain Part 90	)	
Frequencies	)	

COMMENTS OF RITRON, INC.

On September 26, 2016, the Federal Communications Commission released DA 16-1087, which requested comments on a request for waiver of section 90.203(j)(4)-(5) of the Commission's rules filed by the International Municipal Signal Association (IMSA) on August 19, 2016.[1] Pursuant to section 90.203(j)(4)-(5), the Commission no longer accepts applications for certification of Part 90 equipment in the 150-174 MHz and 450-512 MHz bands that cannot operate in a 6.25 kHz mode or with equivalent efficiency.[2] The Federal Communications Commission specifically asked for comments that "address whether the public interest would be served by again delaying implementation of the requirement that applications for certification of Part 90 equipment in the 150-174 MHz and 450-512 MHz bands demonstrate 6.25 kHz capability or equivalent efficiency." Commenters were asked to address the current state of the development of standards for 6.25 kHz technology, estimates of when standards may be finalized, how long after that it would take to design and manufacture compliant equipment and that commenters provide specific data and information on the current effect that the 6.25 kHz capability requirement is having on equipment costs.

Currently, there exists no one standard for 6.25 kHz equivalent operation; the market has segregated itself around a few, mutually incompatible standards supported by some of the larger two-way radio manufacturers. It doesn't appear likely that the market

[1] *See* Request for Waiver (filed August 9, 2016), https://ecfsapi.fcc.gov/file/10819245623424/International%20Municipal%20Signal%20Association%20Request%20for%20Waiver%20--%2099-87%20--%208.19.16.pdf.
[2] *See* 47 C.F.R. § 90.203(j)(4)-(5).

will ever completely agree on one standard, although multi-standard radios could become the norm, at least in the higher-end of the market. Multi-standard radios are not common at this time. Two of the most popular standards, NXDN™ and MOTOTRBO™, take a decidedly different approach to 6.25 kHz compliance, NXDN™ is an FTMA design, while MOTOTRBO™ is a 2-slot TDMA design similar to DMR. Supporting both requires somewhat more complicated hardware than either one alone and more than supporting just analog 12.5 kHz designs.

In some areas of the market e.g. Public Safety, one standard is virtually mandatory for interoperability. In lieu of a single 6.25 kHz equivalent standard, the 12.5 kHz analog standard has become a regulatory requirement.[3] In the Business and Industrial segment, there exists situations where a protocol has been structured for data rates that are lower than the data efficiency standard required by 90.203(j)(3), but changing to a compliant protocol would cause significant disruption during the transition period. An example of such a situation is the legacy protocol used in the Head-of-Train to End-of-Train radio link system used by the railroads to verify the integrity of the brakes of a train. In both the Public Safety and Business and Industrial segments of the Part 90 market, changing to a newer, compliant product does nothing to enhance the operation of the system, adds unnecessary costs, and could possible cause safety issues during the transition period.

The impact of 6.25 kHz compliant product costs falls into two categories, the cost of supporting the 6.25 kHz equivalent technology itself and the cost of supporting the standard for the voice compression required to support 6.25 kHz technology. The technology has advanced to the point where the cost difference between supporting a strictly analog radio and one that must support both analog and the digital modes[4] that meet the FCC's 6.25 kHz efficiency requirements is diminishing, but at this time one might easily see a $10 or so cost adder over an analog-only product. With ongoing advances in technology, this will most certainly decrease, but it's difficult to design a radio much lower in cost than an analog-only product as evidenced by the FM two-way radios used in services not affected by the 6.25 kHz certification mandate such as FRS and MURS.

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[3] *See Emission Mask Requirements for Digital Technologies on 800 MHz NPSPAC Channels; Analog FM Capability on Mutual Aid and Interoperability Channels*, Report and Order, 31 FCC Rcd 4250, 4272-76, paras. 56-65 (2016).

[4] 12.5 kHz analog operation is still so pervasive that most radio products, unless special purpose, have to support both modes.

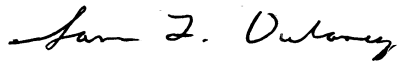
One area that unequivocally impacts the cost of a 6.25 kHz efficient radio is the cost of the vocoder, the vocoder being the device or software that reduces the bit rate of the raw digitized voice to a much lower rate that can meet the channel-bandwidth spectrum requirements. All of the most popular 6.25 kHz standards being used, including NXDN™, MOTOTRBO™, DMR, and APCO-25, use a vocoder developed and sold by Digital Voice Systems, Inc. (DVSI). Their vocoders are patented and they currently hold a monopoly on the vocoders actually used in the industry. DVSI doesn't publicly disclose licensing terms, but the experience of Ritron is that the licensing fee for the firmware to go into a digital signal processor integrated circuit to implement their vocoders is about $150,000 for one standard plus about $30,000 for each additional standard and a royalty starting at about $7 per radio. In lieu of buying the firmware, one can purchase an integrated circuit with the vocoder code inside. This IC costs between about $20 and $30, depending upon quantity.

There still exists a market for analog-only, two-way radios licensed under Part 90, but the ability of a manufacturer to design a new analog-only product, or even modify/improve an existing product via a Class II Permissive Change, is stifled by the cost and complexity impact of the 6.25 kHz efficiency rules. It is easy to understand that the commission would impose 6.25 kHz efficiency certification standards on manufacturers before requiring users to actually switch to 6.25 kHz operation so that 6.25 kHz products would be readily available, but in this case it appears that a more suitable strategy would have been to allow the marketplace to guide the manufacturers to 6.25 kHz, rather than certification regulations.

For the above stated reasons, Ritron, Inc. feels that the public interest would be served by again delaying implementation of the requirement that applications for certification of Part 90 equipment in the 150-174 MHz and 450-512 MHz bands demonstrate 6.25 kHz capability or equivalent efficiency. An indefinite date as determined by the market would be most warranted, but in lieu of that, a delay at least until the 2020 date proposed by the petitioner is justified.

Respectfully submitted,

Sam L. Dulaney



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